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ABSTRACT

Western Illinois University, the sixth largest university in the state, opened the GTE Electronic Classroom for use by faculty and students in January 1993. The classroom is a state-of-the-art visual presentation and electronic interaction facility that promotes the use of advanced technologies for large image video projection and discussion. Seats are arranged theater-style, and the instructor controls the sequence and presentation of visuals from an audio/video/computer podium. The hardware for the classroom is described, with an emphasis on the ability to project microscopic views. The development of the classroom, from a gift by the GTE Corporation, is traced, establishing the rationale for its development, the development process, and the approximate costs of the classroom equipment. The classroom is being used by faculty to model how today's technologies can be used in instruction. Using it as a studio will enable the high-end technology to be used for distance education, and steps are being taken to connect it with a public school and another college. Incorporating this technology helps ensure the place of technology in the classroom of the future. (SLD)

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ESTABLISHING AND USING AN ELECTRONIC CLASSROOM: THE WESTERN ILLINOIS UNIVERSITY EXPERIENCE

Paper presented at the regional
"Teaching with Technology" Conference

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ESTABLISHING AND USING AN ELECTRONIC CLASSROOM: THE WESTERN ILLINOIS UNIVERSITY EXPERIENCE

Western Illinois University is the sixth largest university in Illinois and the only public senior institution of higher learning in the west-central region of the state. The campus is located in the rolling countryside 40 miles east of the Mississippi River in the city of Macomb. The campus provides an intimate environment, housing outstanding facilities amid an expansive park-like setting. The university library ranks among the ten largest for non-doctoral degree-granting public universities in the United States. The residence facilities and programs are among the best in the midwest.

The College of Education at WIU enrolls more than 2000 students in six college departments: counselor eduction and college student personnel, educational administration and supervision, educational foundations, elementary education and reading, media and educational technology, and special education. Approximately 90 full-time faculty teach in the college.

Establishing an Electronic Classroom at WIU

The College of Education at Western Illinois University officially opened the GTE Electronic Classroom for use by faculty and students in January 1993. The classroom is a state-of-the-art visual presentation and electronic interaction facility which promotes the use of advanced technologies for large image video projection and discussion. The classroom's 88 fixed seats are arranged in theater style on a 10 degree declining floor before a three foot raised stage. On one side of the stage is the podium from which the instructor controls the electronic technology used for instruction in the room. A large projection screen (7' x 20') is framed by draperies at the front of the room.

The instructor controls the sequence and presentation of all visuals from a Crestron audio/video/computer podium. All equipment accessed through the Crestron is housed on two 8' x 2.5' equipment racks located in an office/work room adjacent to the GTE Electronic Classroom. The Crestron is electronically wired to the equipment racks which house a Macintosh IIci microcomputer, a 386 MS-DOS microcomputer, CD-Rom drive, Syquest drive, a videotape

player, a videodisc player, a 35 mm slide projector, and a satellite input/output feed. A computer monitor inside the Crestron allows the instructor to preview computer graphics or text prior to projecting a 5' x 7' image via a ceiling mounted Sony, "three-gun" video projector. The Crestron also houses a separate video monitor which permits preview capability by the instructor of video tapes, videodiscs, and satellite down-links prior to projection on the large screen. The two computers, the videotape player, the videodisc player, the 35 mm slide projector, and satellite feed are each controlled by means of a touch screen on the Crestron. The 35 mm slide projector allows the presenter to sequence through a carousel of 35 mm slides and to zoom-in or zoom-out on each slide.

Contiguous to the Crestron is an Elmo Visual Presenter which is best described as an electronic opaque/overhead projector. The Elmo uses a wide angle camera which allows documents, full-color photographs, as well as three-dimensional objects to be presented to a large audience. Visual output for the Elmo is projected via the Sony video projector. Hence, objects or visuals the size of a postage stamp can easily be "zoomed-in" or enlarged to a full 5' x 7' image on the projection screen. The platform lighting on the Elmo presentation stand also permits display of individual 35 mm slides. The Elmo Visual Presenter has two video input ports. On a number of occasions, we have connected a video microscope to the Elmo to project microscopic views of living cells to students. The result has been microscopic slides projected over 1000 times (1000x) their actual size to a 5' x 7' image on the screen. Each time we've used the video microscope, audience reaction has been one of stunned silence followed by vocalized "ooohhhs and aaahhhs."

Equipment used in the room also includes 30 wireless, remote key-pads which can be used by students in the class to "respond" to multiple-choice or other objective questions posed by the instructor. Student responses are immediately "tallied" by the computer and can be projected in either bar-graph or pie-chart form on the large screen. In addition, two robotic cameras are mounted in the room. The cameras are used to send live, full-motion images of the instructor to the university's satellite uplink for delivery of distance education via satellite or can also be used for real-time delivery of compressed video via T-1 telephone lines to distance sites connected to

Western Illinois University. In either case, the cameras "follow" the movements of the instructor across the stage or can be focused on the students in the audience. Learners at distance sites can see, hear, and interact live with the instructor and other students who are in the WIU, GTE Electronic Classroom.

The GTE Electronic Classroom

Establishment of an electronic classroom at Western Illinois University was made possible, in part, by a $40,000 gift from the GTE Corporation. During the Spring of 1992 a formal proposal was submitted to officials of the GTE Telephone Operations North Area who oversee GTE telecommunication efforts in Illinois and Wisconsin. Officials visited the campus and met with College of Education administrators and faculty. In July 1992, GTE responded with a $40,000 grant to offset development costs for the project.

Roughly $110,000 in university funds has also been expended for equipment purchases and to refurbish what was previously designated the "little theater" in the College of Education building at WIU and slated to become the GTE Electronic Classroom. Refurbishing the little theater to re-make it into a high technology teaching/learning facility required electrical re-wiring sufficient to meet code requirements and to power electrical equipment installed for the room. In addition, the room was repainted, new carpet was laid throughout, sound absorption treatment was affixed to the walls to improve acoustics, new speakers were installed in the ceiling, recessed incandescent lights were also installed in the ceiling so that lighting in the room could be dimmed or brightened as desired, and a fiber optics line was brought into the room to connect the robotic cameras for full-motion video delivery of instruction to either the satellite uplink on campus or codec units to redistribute compressed video to external sites linked by T-1 lines.

Rationale for Establishing an Electronic Classroom in the College of Education

The following assumptions were viewed as critical factors in justifying the need for an electronic classroom in the College of Education at WIU and in setting forth procedures to establish such a facility.

1. Faculty and administrators should understand and accept the benefits of using multimedia technology for their own management needs as well as for the education of students.

2. Faculty should be computer literate and knowledgeable in instructional classroom management systems and be comfortable with instructional technology.

3. Faculty should view the computer and other technologies as tools to achieve curriculum objectives and teach higher level thinking skills, as well as understanding that computer use is an essential skill for students.

4. Faculty should take part in adapting technology to their curricula and their classrooms.

5. Faculty should be included in the planning process to utilize technology in teaching/learning thereby assuming ownership over the process.

6. Faculty should adapt to a different teaching style when integrating advanced technologies in the instructional process thus facilitating and engaging students in the learning environment.

7. Administrators should provide support, cooperation, and commitment to the integration of technology into the teacher education curriculum.

8. Faculty support in the form of a multimedia development center or facility must be provided to allow faculty opportunities to develop instructional materials for display in a technology-rich teaching/learning facility.

9. Instructional design and technical support must be made available to faculty to assist in planning and developing instruction for delivery in an electronic classroom.

10. Inservice training, peer coaching, and information exchange must be part of the process to enhance the use of technology for instruction by faculty and administrators.

Process Followed for Developing an Electronic Classroom at WIU

In 1990, research began on the electronic classroom for the College of Education at Western Illinois University. A Task Force on Technology was formed and given the charge to establish an electronic classroom to be used as a model facility for preservice teacher education and other courses in which technology is used heavily. The evolution of the classroom can be summarized in the following five phases: analysis, design, installation, implementation and evaluation. The following outline lists some of the major tasks and important considerations involved during each phase.

Analysis

- Form a committee composed of faculty and technical specialists
- Conduct needs assessment -- determine primary uses of the classroom and prioritize
- Research the existence of other electronic classrooms (university and industry)
- Develop mission statement and philosophy

Design and Planning

- Establish an advisory committee composed of faculty representation throughout the college
- Develop a systems design for the classroom
- Conduct utilization assessment to determine most appropriate facility
- Solicit potential outside funding sources

Installation

- Contact several potential contractors qualified to install the equipment and call previous clients of contractor to establish credibility
- Hire only one contractor to complete the entire installation phase to help ensure that misunderstanding between what is desired and what actually occurs are minimized
- Monitor installation on a regular basis to ensure equipment is being installed according to system design specifications

Implementation

- Develop a "policies and procedures" statement which clarifies such issues as priority of usage, scheduling, people who have access to the classroom, standards for software and hardware support, policies on faculty using their own hardware, etc.
- Plan inservice training strategies to assist faculty in effectively utilizing the capabilities of the classroom
- Identify plan for maintenance of equipment and troubleshooting (eg. hire a systems technician)
- Decide on instructional design support for faculty who need assistance redesigning their curriculum and instructional materials for the classroom (instructional design support)

Evaluation

- Conduct formative evaluation to determine how classroom is being used
- Determine if faculty are modifying their teaching approaches when using the classroom, and ascertain if these changes are enhancing instruction
- Assess changes in students' perceptions, attitudes and performance

Components of the GTE Electronic Classroom and Approximate Costs

Listed below are some of the basic equipment items which make up the technology profile for the GTE Electronic Classroom.

• Large projection screen (7' x 20') for image projection from several media	$ 800
• Video projector mounted on ceiling with multisync capabilities for computer and video display	20,000
• Crestron podium with electronic control menu panel for controlling lights, sound, and all media equipment; and two multisync monitors in the podium for displaying the images sent to the large screen projector and a preview monitor	12,000
• 386 PC microcomputer with keyboard	1600

• Macintosh IIci microcomputer 16 MB Ram, 230 MB hard drive, ethernet card, video spigot, CD-ROM drive, keyboard, etc.	5500
• Laserdisc player with interface cable to PC and Macintosh computer	1200
• Videotape player in VHS and S-VHS	1500
• Elmo color slide projector	2400
• Elmo Visual Presenter	3500
• Wireless keypads (30 individual keypads)	22,000
• Robotic cameras (2) mounted from ceiling	7000
• Peripheral hardware, etc.	4000
• Microscope camera	3500
• Site preparation (materials and installation for all sound, lighting, electrical wiring and controls, structural changes to accommodate handicapped, carpeting, acoustics, fiber optics connection, multi-plexer units, etc.)	65,000
Approximate Total	$150,000

Use of the GTE Electronic Classroom by the WIU College of Education

The room serves as a demonstration facility, showing students how technology is integrated into a teaching/learning environment. As such, faculty are expected to model effective teaching behaviors using technology. To support this effort, an instructional designer and a technical systems manager have been hired by the College to (1) work with faculty to design and develop instructional materials to be used in the new classroom, (2) orient faculty on the proper use of equipment accessed via the Crestron podium, and (3) provide training for faculty on how to properly use the technologies available for instructional use. Systematic orientation and training programs are made available to faculty interested in using the Electronic Classroom for their students. Scheduling policies and guidelines for use have also been drafted and shared with all college faculty.

Use of the room is centered on the premise that current and advancing technologies are changing the way we learn and, of necessity, will change the way we teach. Otherwise, educators have little hope of maintaining the interest and attention level of students. With "entertainment technologies" from sources such as Nintendo, Selga Genesis, karaoke, computer and/or video games, MTV, or the Comedy Channel -- to name just a few -- today's students have little interest in listening to dull, uninspiring lectures. Today's society, and youth in general, are highly visual.

Individuals preparing to enter the teaching profession must be skilled in preparing instructional units/lessons which are visually based. An electronic classroom promotes this need.

As noted, the classroom is being used by faculty to model how today's technologies can be used in instruction. Furthermore, under the direction of technology literate faculty, students are allowed opportunity for "hands-on" exposure in peer teaching, micro-teaching, and classroom presentation settings. It is hoped that students enrolled in teacher education courses will become both accustomed to seeing technology integrated as part of their educational experience *and* will become adept in using the technologies themselves. Such teachers, prepared for schools of the 21st century, will help perpetuate the increased use of computer and digital technologies among an increasingly astute student body raised on entertainment technologies.

Distance Learning and the Electronic Classroom

Use of the robotic cameras enable full-motion and compressed video signals to be sent via the fiber optic connection in the College of Education to the university's satellite uplink or to codec units on campus for T-1 distribution. The Western Illinois University and Illinois State Board of Education Satellite Education Network links 110 rural schools throughout Illinois for K-12 instruction and teacher inservice training. Presently over 350 hours of live programming originate via satellite from the network each academic year. In the past, the programming has originated from TV studios located in Memorial Hall, about 1/2 mile from the College of Education building. With cameras and telecommunications equipment in the GTE Electronic Classroom, programming can be fed directly to the satellite uplink for broadcast to downlink sites not only in Illinois but throughout the nation. The convenience of using the electronic classroom as a dual classroom/studio facility minimizes the movement of personnel, studio sets, equipment, etc. which has been the practice in the past. More important, however, use of the GTE Electronic Classroom as the studio allows the instructor to use the classroom's high-end technology for integration in distance education.

At the time of this writing, three codec units have been ordered to connect the GTE Electronic Classroom via T-1 lines with Blackhawk Community College and with Lincoln Public

School in Springfield. This cooperative venture will allow real-time transmission of two-way video/audio communication in a compressed mode. The first class to be offered will be a graduate level early childhood education course scheduled between the three sites for June 1993.

Under the auspices of a Higher Education Cooperation Act grant (HECA), plans are also underway to propose a Western Illinois Education Consortium (WIEC) T-1 Network linking the following institutions/organizations: Highland Community College, Sauk Valley Community College, Quad Cities Graduate Study Center, Black Hawk College, Black Hawk College (east campus), Carl Sandburg College, Spoon River College, Western Illinois University, CONVOCOM, and John Wood Community College. This proposed western Illinois network would be linked by existing T-1 telephone lines capable of 4 channels of full duplex audio/video transmission at 384 kbps each. Each site would have fully integrated codec units able to both receive and transmit audio/video signals. Additional band width on the T-1 lines would be available for computer (data) transmissions. The technology would also allow Switch 56 capability at each site for extension of the network to area schools.

Conclusion

New and developing instructional technologies will continue to bombard the educational marketplace. This is occurring at a time when some teachers are still trying to cope with the introduction of the microcomputer in the mid-1970's. The thought of incorporating laser disc technology, CD-Roms, video text, electronic mail, video imaging, telecommunications, and distance learning must seem mind boggling to many. Certainly, the challenge is not a simple one. Yet, if those who administer teacher education programs fail to incorporate modern technology as part of the preparation process for tomorrow's teachers, and if educators in general fail to integrate modern and evolving technology in American classrooms, the education provided in our schools will have limited impact in the lives of many students.